



Chemical Engineering  
Faculty of Engineering

University of Waterloo  
200 University Avenue West  
Waterloo, Ontario, Canada  
N2L 3G1

519 888 4567  
Fax: 519-746 4979

603

July 3, 2002

Mr. Jean-Paul Nguyen  
Chief Engineer  
Departement Brevets  
Institut Francais du Petrole  
1 et 4, avenue de Bois-Preau  
92852 Rueil-Malmaison  
Cedex, France

N/Ref.: 3627/10/X – AR  
the UNITED STATES OF AMERICA  
Titre: PROCEDE ET DISPOSITIF D'ELIMINATION DE PARTICULES  
CONTENUES DANS UN COURANT DE FLUIDE.  
Numero de depot: 09/872,010 – Date de depot: 04 juin 2001



Dear Mr. Nguyen:

British Patent No. 632,360 p. 1, lines 31 to 34: "The present invention ... reduces the turbulence of the air to a minimum ...". p. 3, lines 26 to 28: "... a gas stream entering the channel substantially devoid of turbulence assumes vortex flow ...".

The above quotes show that in the British Patent:

- (i) there was practically no turbulence
- (ii) there was vortex flow in the flow channel

Therefore, the British Patent asserts that there can be vortex flow in the virtual absence of turbulence.

In the British Patent the words "vortex" and eddy" are used as synonyms. On p. 1, lines 85 to 87: "... because of outward eddies resulting from the boundary layers of the stream of air being retarded by the wool pile". On p. 4, lines 18 to 22: "... because of vortices outwardly directed from the central or main flow through the channel and possibly resulting from the boundary layers of the stream of air being retarded by the wool pile."

The words "vortex" and "eddy" are also synonymous in Roget's International Thesaurus, 4<sup>th</sup> edition 322.2.

The dictionary definitions of "vortex" and "eddy" are as follows:

Webster's Third New International Dictionary. Vol. III.

"vortex" 2: "a region within a body of fluid in which the fluid elements have an angular velocity."

Page 1 of 2

Mr. Jean-Paul Nguyen  
Chief Engineer  
Departement Brevets  
Institut Francais du Petrole  
July 3, 2002

Page 2 of 2

ibid.

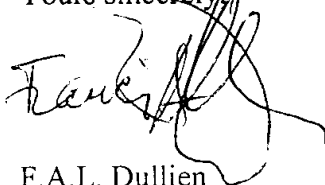
"eddy" 1: "a current of air or water running contrary to the main current; esp: one moving circularly."

The attached mathematical definition of "vortex" is from Streeter, "Fluid Mechanics", McGraw-Hill, 5<sup>th</sup> edition, pp. 74 and 419-420 (Attachments #1 and #2). It is noted that turbulence is not necessary for a "vortex". A vortex is merely rotational flow.

Photographic visualization of rotational flow (called "eddy" in this source) in the creeping flow regime, in the complete absence of turbulence, is also attached (Attachment #3) (An Album of Fluid Motion, The Parabolic Press, Stanford. Cal. 1988, p. 15). The definition of "creeping flow" attached is from Bird, Stewart, Lightfoot "Transport Phenomena", Wiley, 1960, pp. 56-57. (Attachment #4.)

Yours sincerely,

λ



F.A.L. Dullien  
Distinguished Professor Emeritus

FALD:dw  
Attachments (4)